

# Assessing the Immediate Impacts of the Recent Chemical Fertilizer and Other Agrochemical Ban on Agriculture Production in Sri Lanka

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## ABSTRACT

*In May 2021, the government of Sri Lanka imposed a ban on chemical fertilizer and other agrochemical imports aimed to foster financial and environmental sustainability within the agricultural sector. However, the swift enactment of the policy without comprehensive analysis instigated uncertainty and unrest among farming communities, and the ban was revoked in November 2021. This policy brief elucidates the performance of agricultural production in Sri Lanka in response to the aforementioned policy change, highlighting the need for well-informed and balanced approaches to support sustainable agricultural development. This study was conducted from August to September 2022, to determine the policy's short-term impact on the production of paddy, vegetables, other field crops, and potatoes. The findings shed light on a significant yield reduction that persisted in agriculture production, due to inadequate application of essential plant nutrients at the appropriate time. These results underscored the challenges of pursuing a complete transition to organic farming, as it proved unsustainable and posed a threat to the livelihoods of a vast community. While the necessity for environmentally and economically sustainable fertilizer policies remains evident, the research suggests that extreme measures such as total bans or restrictive licensing may not be viable in the short term.*

**Keywords:** Agriculture production, Fertilizer policy, Import ban, Organic agriculture

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## **Introduction**

To enhance agricultural productivity, promote food security, and ensure economic sustainability, the Sri Lankan government has implemented various fertilizer subsidy policies for the past sixty years. On May 6, 2021, the government introduced the Import and Export (Control) Regulations No. 7 of 2021, which prohibited the importation of chemical fertilizers and agrochemicals into the country (Weerahewa et al, 2022). Since these policy actions were not fully informed, they created a sense of uncertainty and unrest among farming communities who had been accustomed to practising input-intensive agriculture throughout their lifetime. Subsequently, the government eased the restriction and allowed the private sector to import chemical fertilizers by issuing licenses. Though the ban on the import of chemical fertilizers was lifted on November 30, 2021, fertilizer importation has not turned to its regular status due to the foreign exchange burden and the high international market price of the fertilizer (Beillard & Galappattige; 2022).

The government encouraged the production of organic fertilizers locally by providing subsidies and importing different kinds of organic amendments to fulfil the nutrient requirement of the crops. Even though irregularities in the distribution and use of those fertilizers in the field were reported, the majority of the farmers continued their cultivation. Different predictions on the possible impacts of the fertilizer ban and mix yield results were reported in various sources but there was limited scientific research on the effects of fertilizer policy change on relative productivity in Sri Lanka (Weerahewa, Senaratne & Babu; 2021). In light of this, this research was designed to identify the effects of this fertilizer policy change on agriculture production by estimating yield variations in paddy, other field crops, vegetables and potato crops using on-farm data from a nationally representative survey.

## **Approach**

Since this was a national-level policy, all the crop sectors in the country were affected by the policy decision more or less equally. Crops to be studied were selected considering their' importance on household food security, extent under cultivation, the importance of the crop as a livelihood, and importance to the industry. An all-island survey was conducted in 16 districts on all main crop categories including paddy, vegetables, other field crops (OFC), and potato, covering different agro-ecological zones and irrigation schemes to capture regional differences. The major crops covered are paddy, maize, chilli, big onion, potato, brinjal, okra, luffa, beans, cabbage, and tomato. Since there is no well-established national-level database about several growers under each crop type in the country, the total population is considered unknown in the sample calculation. Since this study needs to cover a large geographical area and heterogeneous groups in the entire country, the multi-stage stratified sampling method was used. A detailed sample is given in Table 1.

**Table 1. Sample information**

| <b>Crop</b>   | <b>Number</b> |
|---|---------------|
| Paddy – Major irrigation                                | 251           |
| Paddy - Minor irrigation                                | 141           |
| Paddy - Rainfed   | 233           |
| Maize   | 208           |
| Chili   | 171           |
| Big onion   | 232           |
| Potato  | 92            |
| Country vegetables (Beans, Tomato, Cabbage)             | 490           |
| Low country vegetables (Brinjal, Ladies fingers, Luffa) | 292           |
| <b>Total</b>  | <b>2110</b>   |

The 2020/21 Maha season data before the policy change was considered the baseline and was compared to data from the 2021/22 Maha season, which was collected from August to September 2022.

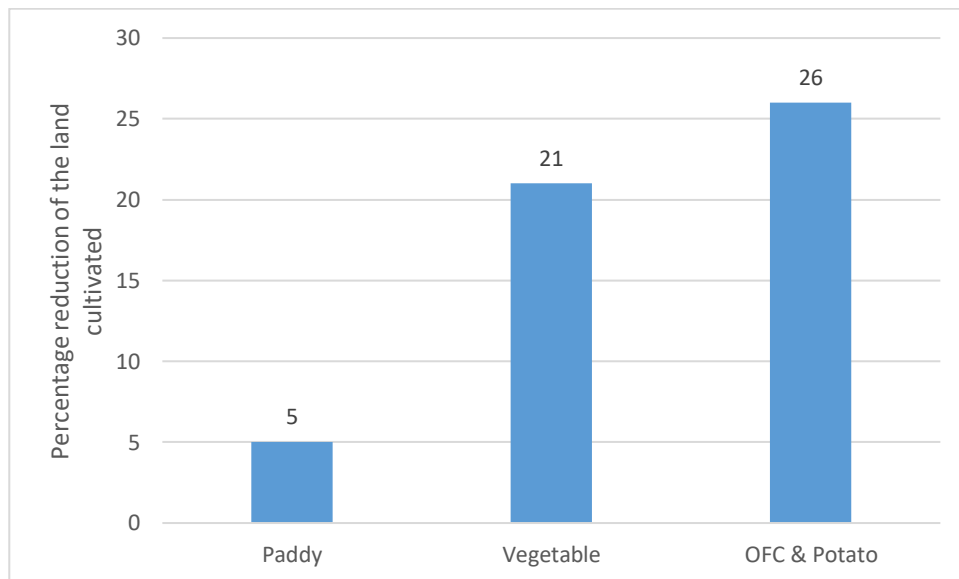
## **Results and Discussion**

This section highlights a few key major findings from the study that are important to decision-makers.

### **Changes in the Extent Cultivated**

Understanding the dynamics of changes in agricultural land use is of great significance when assessing the implications and outcomes of import bans on the agricultural sector and food security in Sri Lanka. Notably, the extent of paddy cultivation experienced the least reduction when compared to other types of crops (refer to Figure 1). Conversely, minor irrigation systems demonstrated the highest decrease in cultivated area. Among the other field crops (OFCs), chilli cultivation exhibited the most substantial reduction, followed by maize and big onion.

Similarly, there was a statistically significant decrease in the extent of land cultivated with vegetables during the 2021/22 Maha season, compared to the preceding 2020/21 Maha season, which took place before the fertilizer policy change. Among vegetables, beans encountered the lowest reduction in extent, while low-country vegetables exhibited relatively higher reductions compared to up-country vegetables. Further, 21% of farmers reported a reduction in the area of cultivation due to concerns surrounding fertilizer availability, while some farmers reported redundant cultivation of specific plots due to fertilizer-related issues.



**Figure 1. Percentage change of the land extent under cultivation with policy change**

### **Farmer Experience in Organic Fertilizer Availability, Use and Quality**

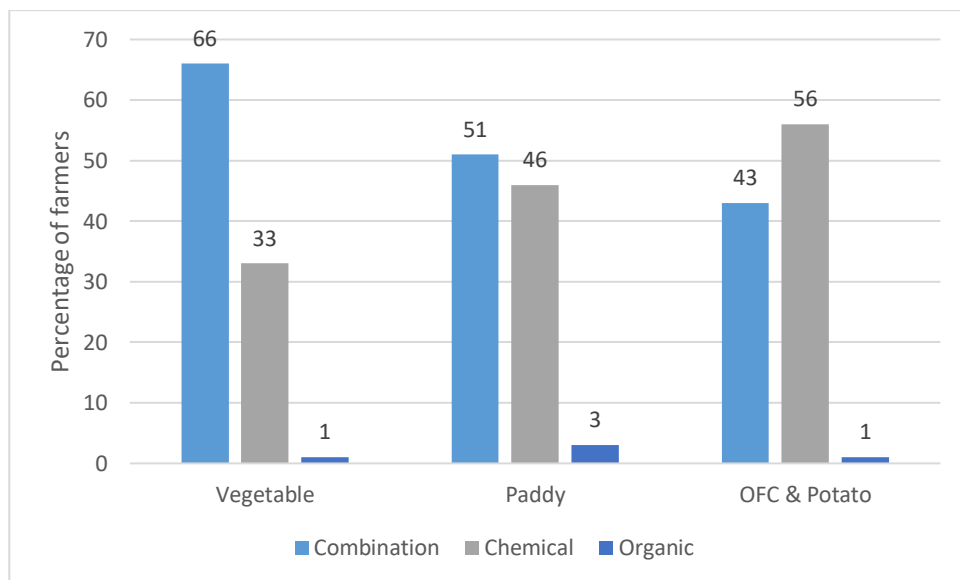
Only 15% of paddy farmers had applied organic fertilizers to their crops before the import ban and the number was raised to 86 percent in organic fertilizer applications after the import ban. Similarly, the use of organic fertilizers before the policy change was comparatively low in the OFC sector (26%). With the promotion of organic agriculture through the policy change, the number of organic fertilizer users increased to 58 percent in OFC and potato cultivation. Conversely, even before the government declared an organic movement, 64 percent of vegetable farmers applied organic fertilizers to their crops with the understanding that it improves the soil and helps moisture retention.

However, the majority of farmers could not make the organic fertilizer by themselves adequately and resorted to purchasing it from the market. Furthermore, farmers noted

that it was difficult to find required large quantities of organic fertilizer, high labour requirements and that applying organic fertilizer alone is not economically sustainable for commercial cultivation.

### Farmers' Perception of Plant Nutrient Management and Fertilizer Subsidies

Farmers were surveyed to obtain their perspectives on using organic, chemical, or a combination of both methods to understand the most preferred approach for supplying nutrients to plants. Most farmers are not in favour of using complete organic fertilizers in crop production. Only one percent of vegetable and OFC farmers expressed a willingness to adopt this approach. In comparison, three percent of paddy farmers prefer to adopt completely organic products. Instead, 66 percent of vegetable farmers prefer using chemical and organic fertilizers combinations, while 51 percent of paddy and 43 percent of OFC farmers prefer a combination of organic and chemical fertilizers (Figure 2).



**Figure 2. Farmers' perception on plant nutrient supply**

### Changes in Crop Yields

The survey findings indicate that as compared to the previous Maha season, there is a reduction in paddy yield, with an overall average yield reduction of 53%. The data before and after the import ban revealed that 62% of farmers experienced a yield loss of over 50%. The primary reason cited for the decline in yield was the unavailability of chemical fertilizers in required quantities (54%) and the failure to apply chemical fertilizers on time (40%).

Furthermore, the majority (92%) of OFC and potato farmers noted a decline in their yield after the policy change, with an overall average yield loss of 52%. The most significant yield reduction was observed in maize (68%), while the lowest reduction was in chilli (43%). The data further indicated that 64% of farmers experienced a decline in yield of more than 50% after the policy change, with the most significant reason for this being the restrictions on chemical fertilizers and other agrochemicals, accounting for 76% of all reasons cited.

The survey also revealed a significant decline in up-country and low-country vegetable production output during the 2021/22 Maha season when compared to the normal 2020/21 Maha season. The estimated average yield loss in the 2021/22 Maha season as a proportion of the normal season average yield shows a production loss varying from 0 to 100 per cent. On average, farmers experienced more than 57% average yield loss per acre, despite using some chemical fertilizers in combination with organic fertilizers. However, the farmers faced challenges in adequately applying the necessary quantities of fertilizers at the appropriate times, despite their efforts to utilize both types of fertilizers.

## **Conclusions**

The findings of the study emphasize a significant decline in crop yields both before and after the policy change, primarily attributed to the inability to supply an adequate quantity of plant nutrients despite the utilization of organic and some chemical fertilizers. This reduction in agricultural output has resulted in substantial welfare losses and adverse implications for food security. To sustain productivity levels, it is crucial to ensure the availability of fertilizers in appropriate quantities and provide relevant recommendations.

Therefore, a comprehensive, long-term approach is necessary to develop holistic and sustainable farming systems. In the short term, government intervention is required to stabilize and regulate the price and quality of fertilizers in the market. The study suggests a gradual and phased transition towards exclusive organic farming, rather than an immediate and comprehensive shift. This approach entails supporting farmers in accessing and utilizing organic fertilizers while ensuring a consistent supply of chemical inputs for those who prefer their use.

Efforts should be directed towards addressing the challenges faced by organic fertilizer producers, such as ensuring the availability of raw materials. Additionally, further research and development are crucial in identifying and promoting sustainable fertilizer policies that strike a balance between economic, environmental, and social considerations.

A gradual reduction in the use of agrochemicals, coupled with a well-planned integration of conventional and organic-based agriculture systems, is essential for the implementation of more sustainable fertilizer policies.

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